University of Agronomic Sciences and Veterinary Medicine of Bucharest
Faculty of Horticulture

International Student Symposium *"Hortus Academicus"*
April 16, 2021, Bucharest, Romania

Microbial endophytic community associated with pear trees

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General objective

general integrated – to organic technology

Specific objective

Microbial functional biodiversity in pear orchards

*Assess microbial **endophytic** community associated with pear trees*

Twigs | *Buds* | *Leaves*

Antagonistic endophytes as biocontrol agents - attractive option for management of some plant diseases.

Endophytes - attractive alternative to chemical pesticides in organic horticulture

endophytes →

Drought stress

Plant growth promoting

Plant Protection
diseases
pests

R19/0.75 m

P1 - P5	Conference	QR530-11
P6 - P10	Conference	Sydo
P11 - P15	Conference	QR196-9
P16 - P20	Conference	Adams
P21 - P25	Conference	QR530-11
P26 - P30	Conference	Sydo
P31 - P35	Conference	QR196-9
P36 - P40	Conference	Adams
P41 - P45	Conference	QR530-11
P46 - P50	Conference	Sydo
P51 - P55	Conference	QR196-9
P56 - P60	Conference	Adams
P61 - P65	Conference	QR530-11
P66 - P70	Conference	Sydo
P71 - P75	Conference	QR196-9
P76 - P80	Conference	Adams

R20/0.8+1.6m

P1 - P3	Euras	Gutui
P4 - P6	Cristal	Gutui
P7 - P9	Romcor	Gutui
P10 - P12	Corina	Gutui
P13 - P15	Orizont	Gutui
P16 - P18	Tudor	Gutui
P19 - P20	H12/83/79	Gutui
P21 - P22	H5/5/84	Gutui
P23 - P24	R3/146	Gutui
P25 - P26	Euras	Rp
P27 - P28	Cristal	Rp
P29 - P30	Romcor	Rp
P31 - P32	Corina	Rp
P33 - P34	Orizont	Rp
P35 - P36	Tudor	Rp
P37 - P38	Euras	Franc
P39 - P40	Cristal	Franc
P41 - P42	Romcor	Franc
P43 - P44	Corina	Franc
P45 - P46	Orizont	Franc
P47 - P48	Tudor	Franc

R24/1.25m

P1, P3, P5, P7	Millenium
P2, P4, P6	Transilvania
P8, P10	Prima Dona
P9	Virgiliu hibernal
P11 - P14	Virgiliu hibernal
P15 - P20	Roșioare de Cluj
P21 - P25	Jubileu
P33 - P35	Haydeea
P36, P38	Prima Dona
P37	Haydeea
P40	Arvena
P42 - P47	Arvena

Biological material

Romanian pear resistant cultivars (Voinești and Cluj-Napoca) and Conference on four rootstocks

Biological material

Conference *- Medium vigour, compatible with quince. Fruit with average weight, elongated piriform, with yellow-green epicarp, covered with rust spots. The pulp is fine, juicy, with a pleasant taste at maturity.*

Euras (1994. Andrieș & Moruju). Tree vigour - medium. Resistant to scab. Tolerant to fire blight and *Psylla sp*.; tolerant to *Pseudomonas syringae*. Fruit: medium size, ovoid shape, semi-fondant pulp at full maturity. Ripening: Oct. – April.

Cristal (2000, Andrieș) *Tree vigour - medium. Resistant to scab and to fire blight. Fruits: medium-large size, conical shape, yellowish - green skin colour, white flesh, fondant pulp. Ripening: Oct. - Nov.*

Biological material

Corina (2004, Andrieș) *- Tree vigour - medium. Resistant to scab. Tolerant to fire blight. Fruits: medium size, conical shape, yellowish - green skin colour, white flesh, fondant pulp. Ripening: Oct. - Nov.*

Romcor (2009, Andrieș). Tree vigour - middle to strong. Resistant to scab. No fire blight attack symptoms. Tolerant to *Psylla sp*. Fruits characteristics: medium to large size, conical shape, yellow-green skin colour, fondant pulp. Ripening: Oct. – Jan.

Orizont (2004, Andrieș) *Tree vigour - medium. Resistant to scab. Tolerant to Psylla sp. Fruits: medium-large size, globular shape, yellow skin colour, semi-fondant pulp. Ripening: Dec. – Feb.*

Biological material

Tudor (2007, Andrieș) *- Tree vigour - medium to strong. Tolerant to scab, fire blight and Psylla sp. Fruits characteristics: large size, pyriform, light yellow covered with bright red on about half of the fruit. Ripening: Sep. - Oct.*

H5/5/84

H12/83/79

H3/146

Biological material

Haydeea *- tree of medium vigor. Medium/ large fruits, short pear-shaped, with yellow epicarp. The flesh is white-yellow, consistent, fine, juicy, sweet.*

Milenium (2003) *- It is a cultivar with winter ripening, the fruit having a good storage in deposit. The fruits are large, conical-truncated, slightly asymmetrical, yellowish-yellow, with small subcutaneous, greenish spots. The fruits have white pulp, juicy, with very few sclereids, good taste, sweet and sour.*

Virgiliu hibernal (2000) *- It is a cultivar with winter ripening, the fruit having a good storage in deposit. The fruits are medium-sized, have a piriform-truncated shape, a color of waxy yellow, with a slight reddish tinge on the exposed side the sun. The fruits have a creamy, buttery pulp without sclereids, a very good taste quality, with fine aroma.*

Biological material

Jubileu 50 (2003) - *It is a variety with summer ripening, fruit ripening taking place starting around the 10th of August. The fruits are of medium size, have a piriform-elongated shape, are of intense yellow color, well browned on the sunny side. The pulp is white, clean, fondant and juicy; the taste of the fruit is very good, sweet-slightly acidic, with a fine aroma.*

Roșioară de Cluj (2005) - *It is a variety with summer ripening, very early, the fruit is harvested at the end of the second decade of July. The fruits are large, pear-shaped, with a carmine-red coating on the whole surface; the skin is thick, leathery and detaches easily; pulpit is white, without sclereids, with weak sweetness, slightly acidic and a weak taste astringent.*

Arvena (2008) - *Fruit ripening period: middle (first or second decade of the month September). Medium-large fruits. Fruit color: greenish-yellow, with a coppery shade at maturity optimal consumption. The pulp of the fruit is white-yellow, dark, with few*

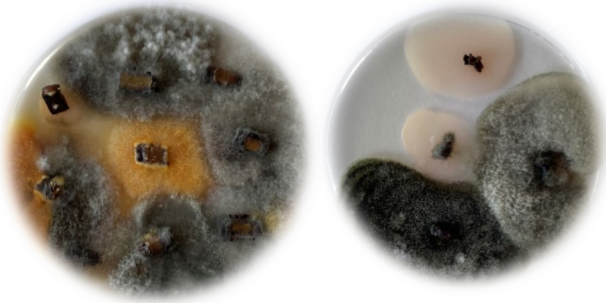
Transilvania (2010) - *Behavior in the attack of diseases and pests: it is tolerant to scab and septoriosis; is susceptible to Psylla sp. The fruits have a white, white-yellow pulp at maturity consumption, sweet and pleasantly acidic, very pleasant taste and fine aroma, discreet.*

Microbial endophytic community: isolation and identification

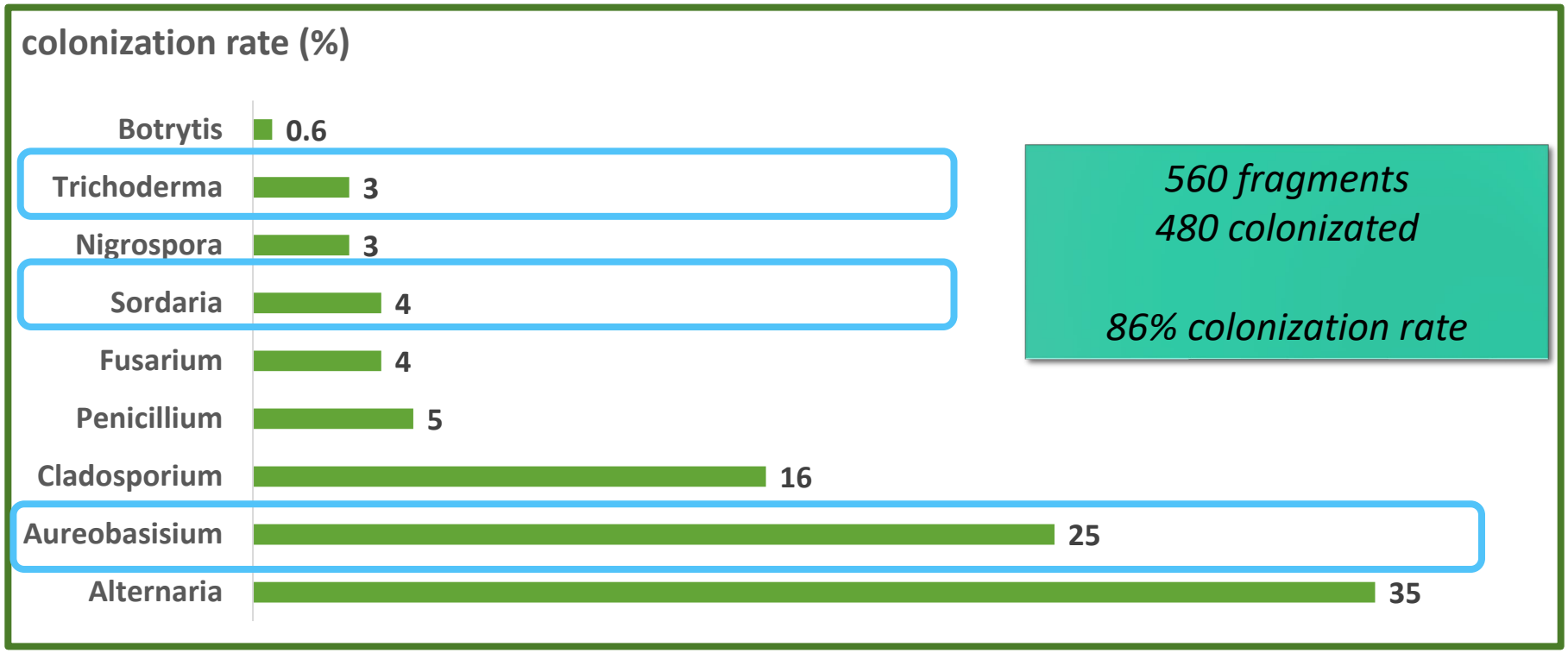
Pear twigs were collected on march 2021. The twigs were cut into small pieces (0.5cm, surface sterilized using 70% ethanol, 2 minutes; 4% NaOCl 90 seconds; rinsed in water for three times). The tissues were blotted dried and plated on potato dextrose agar (PDA). Plates were incubated at 22°C until growing of colonies. Pure culture of isolates was acquired through subsequent sub-culturing on PDA plates.

Morphological identification. Fungal isolates were identified based on their macroscopic (colony colour, pigmentation) and microscopic characteristics.

Results expressed as CR - Colonization Rate (%)



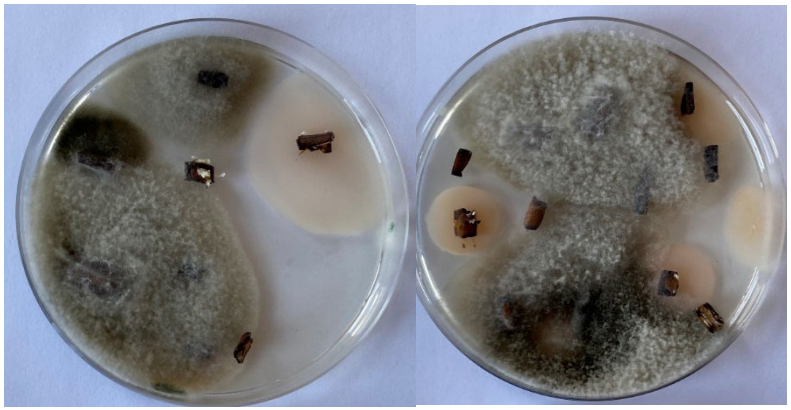
Endophytic community associated with pear twigs

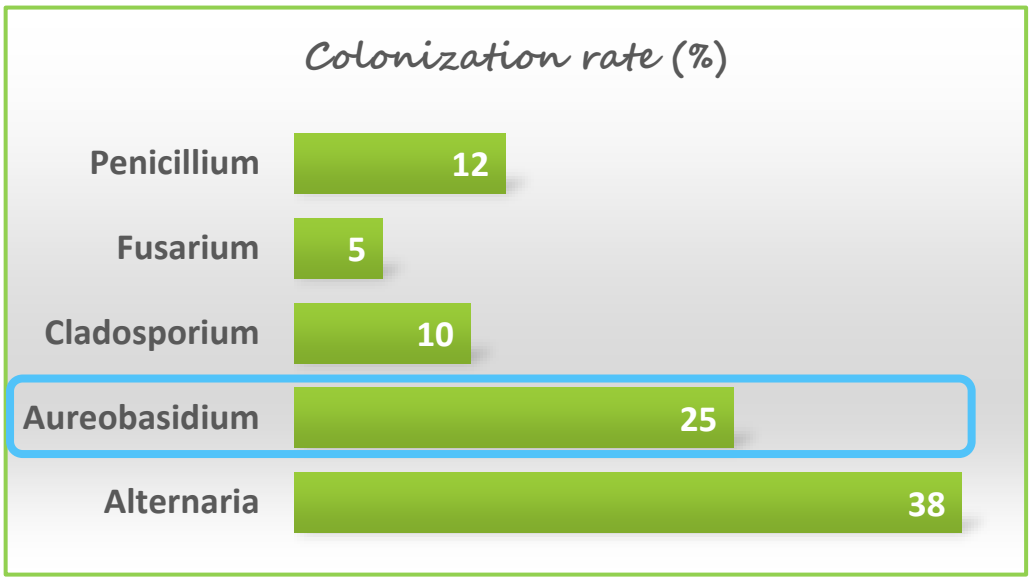


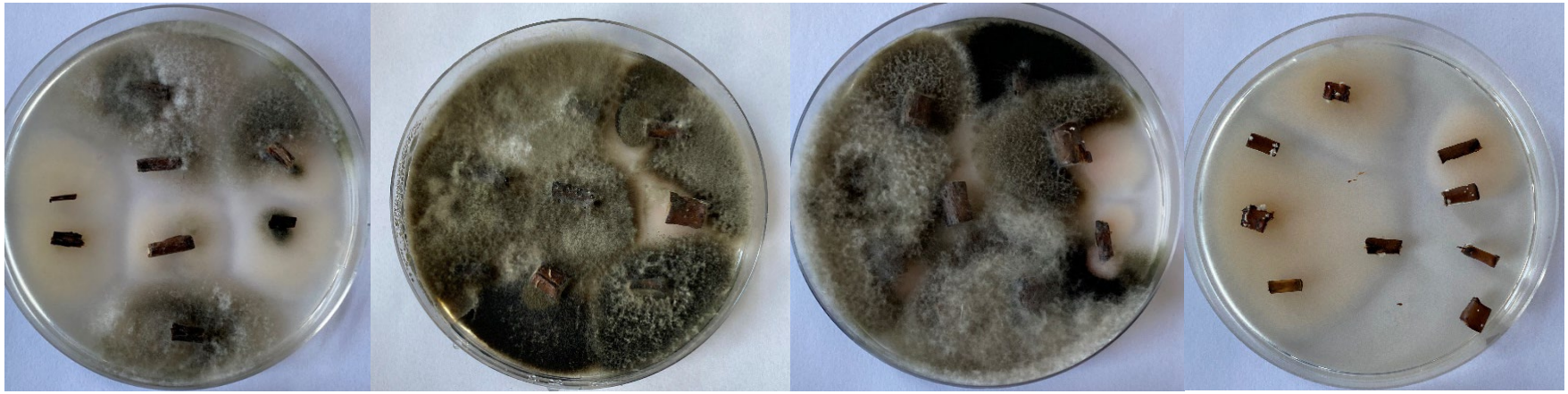
560 fragments
480 colonizated

86% colonization rate

Twigs | Conference

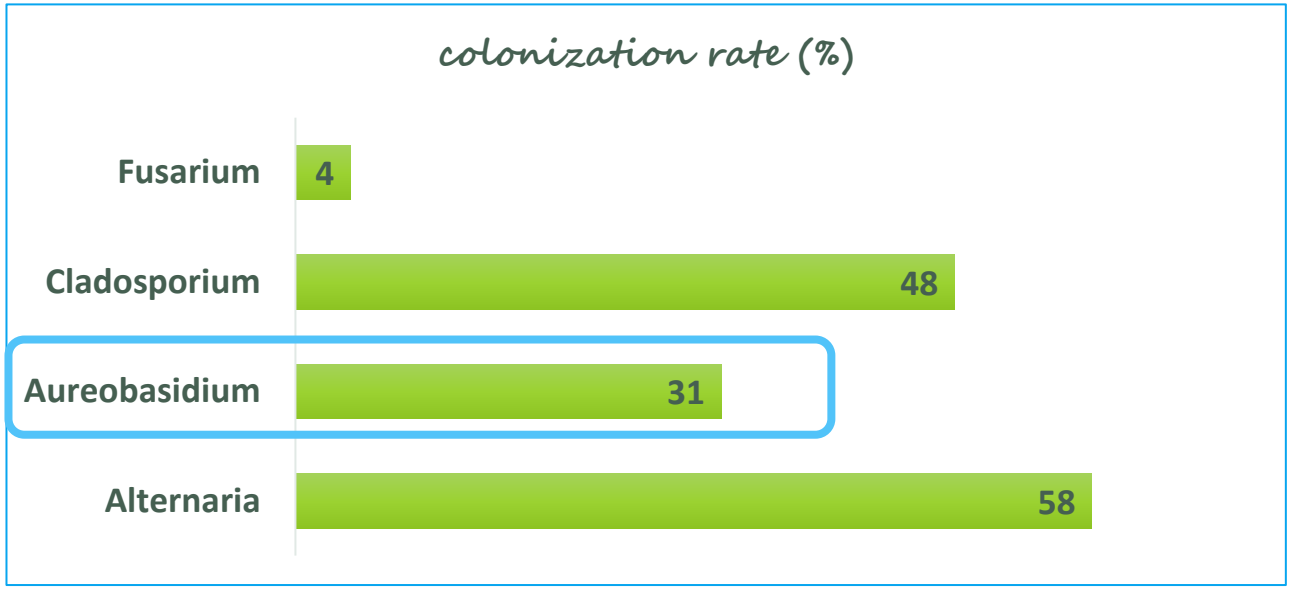




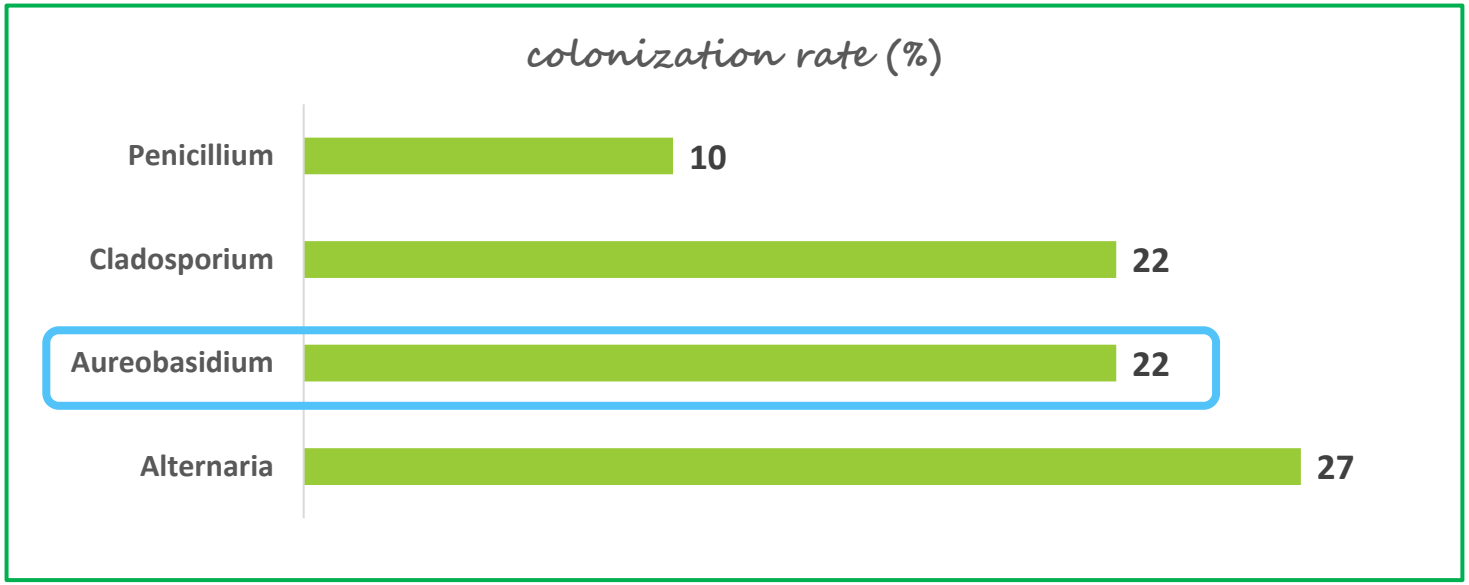


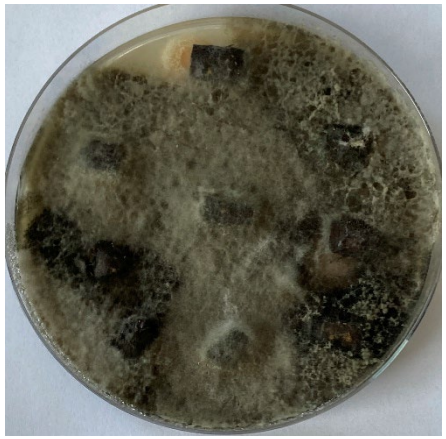
Endophytic community associated with pear twigs

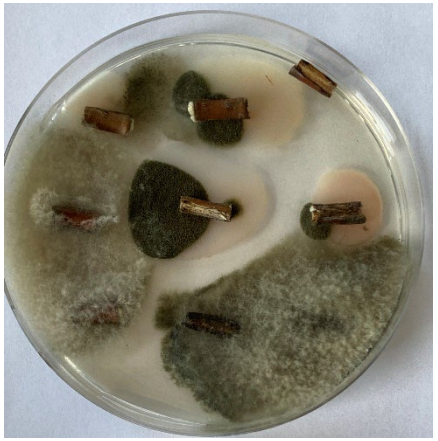
Twigs | Euras


colonization rate (%)
Fusarium
4
Cladosporium
48
Aureobasidium
31
Alternaria
58

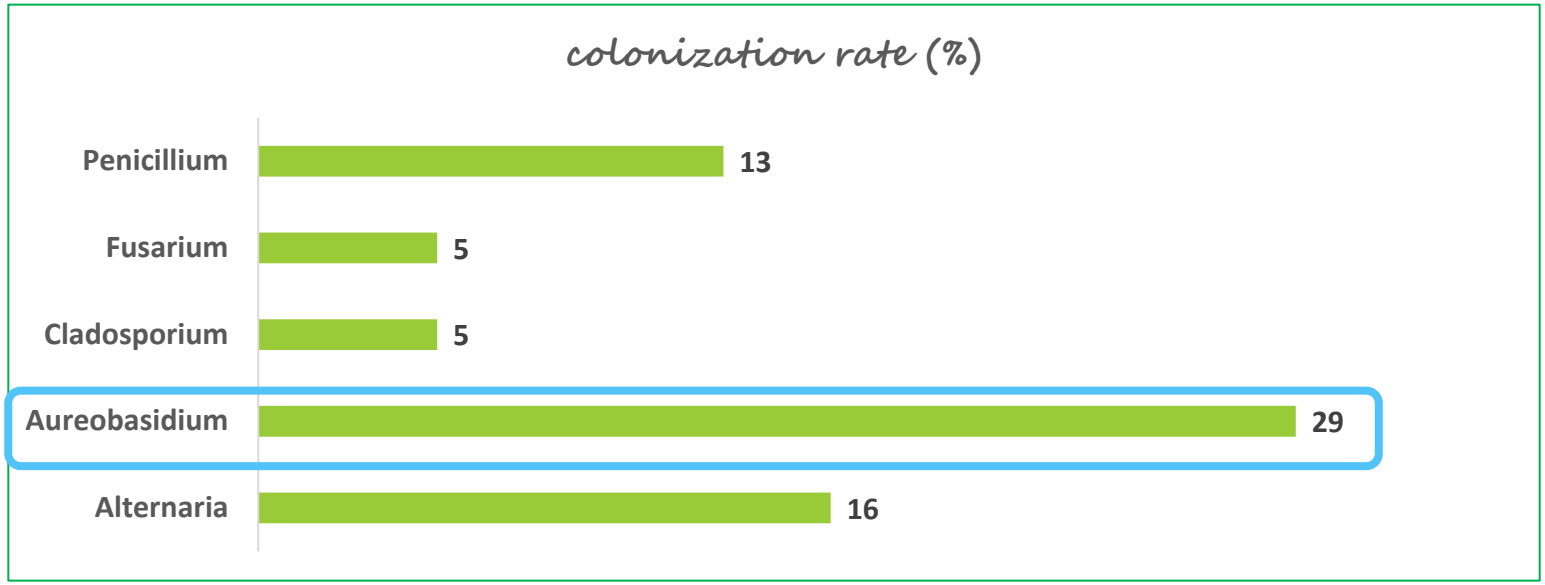
Twigs | Cristal

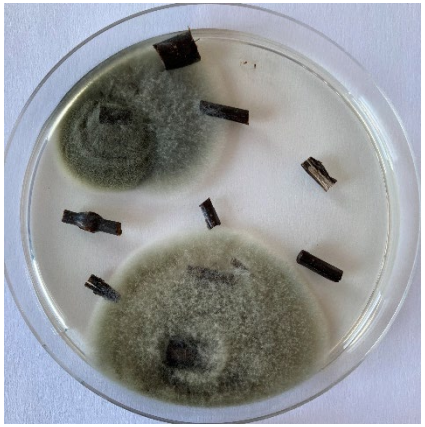




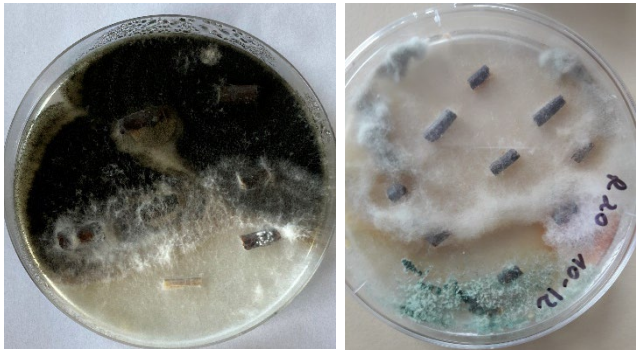


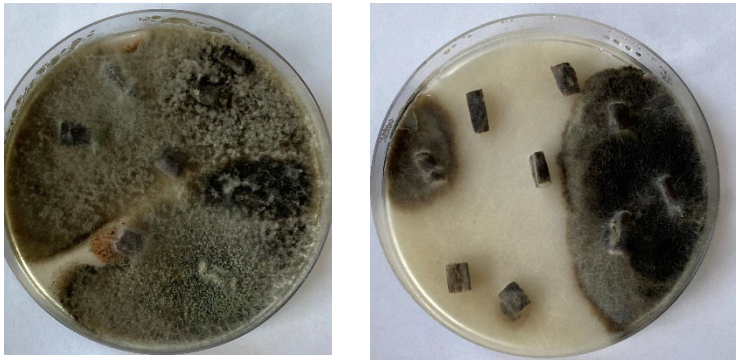
Twigs | Romcor

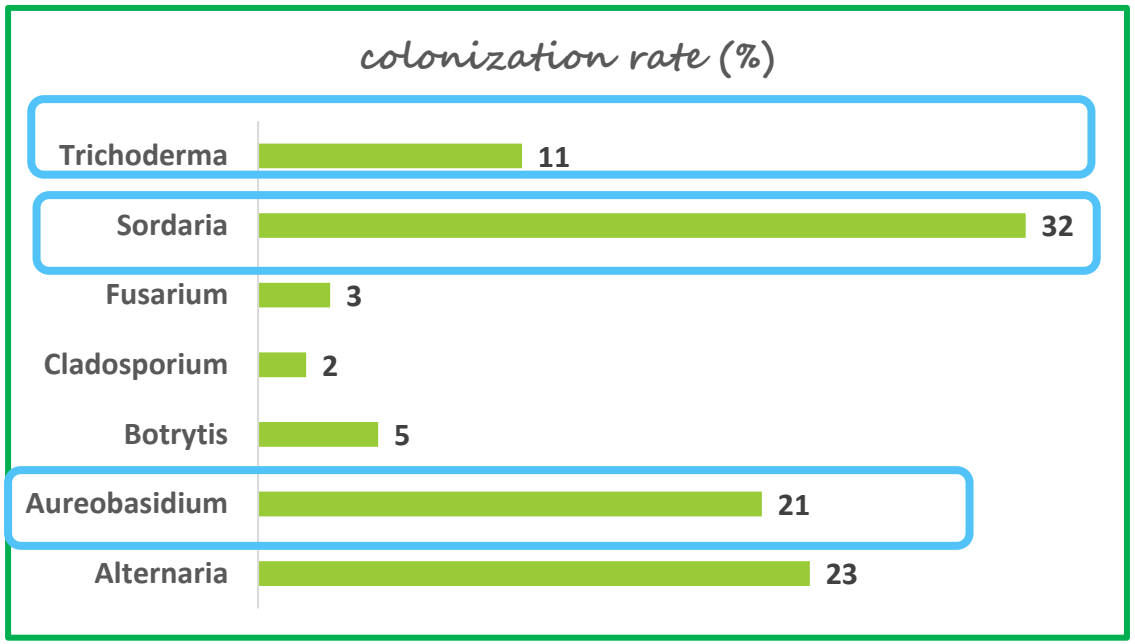


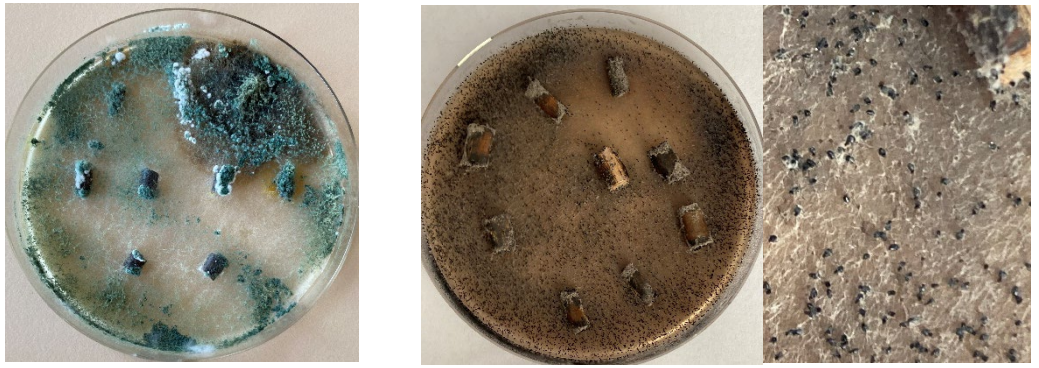


Twigs | Corina

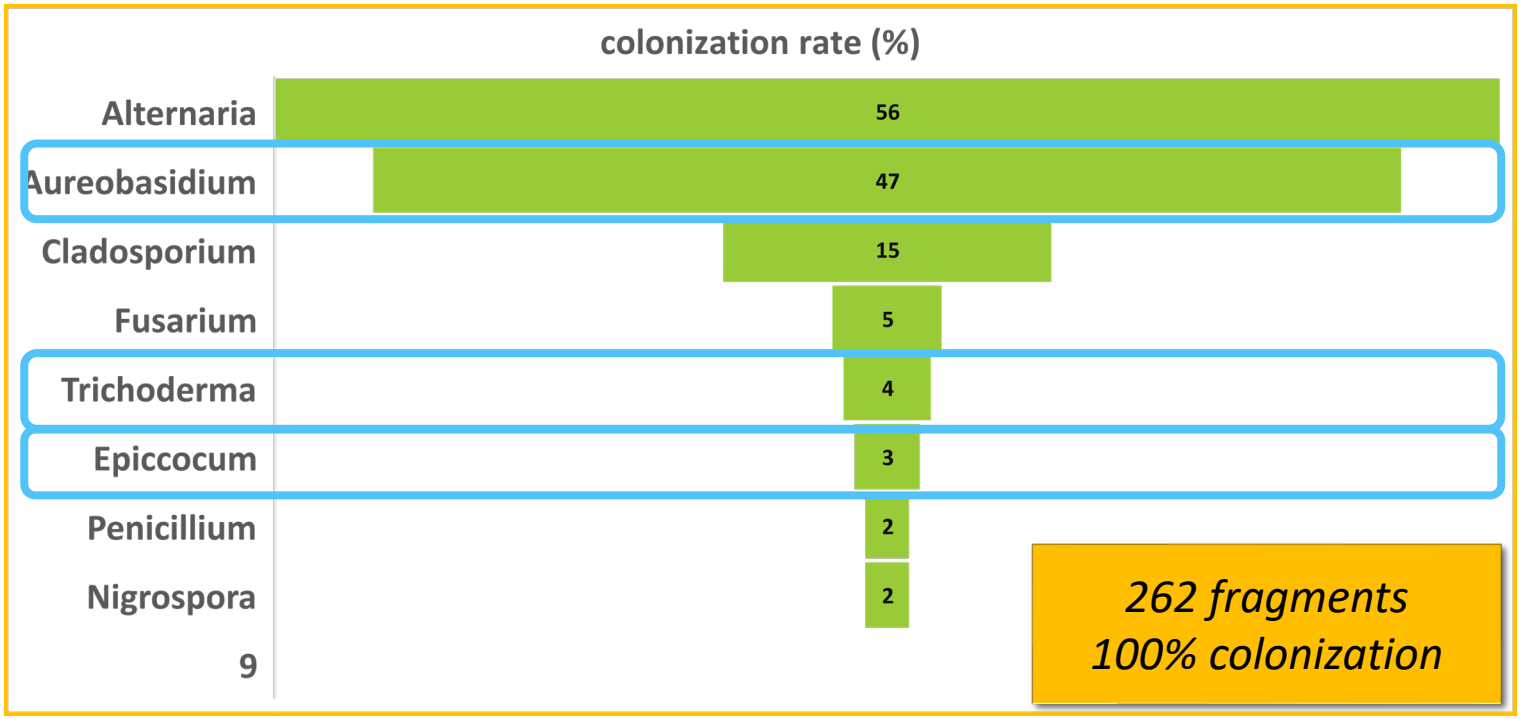


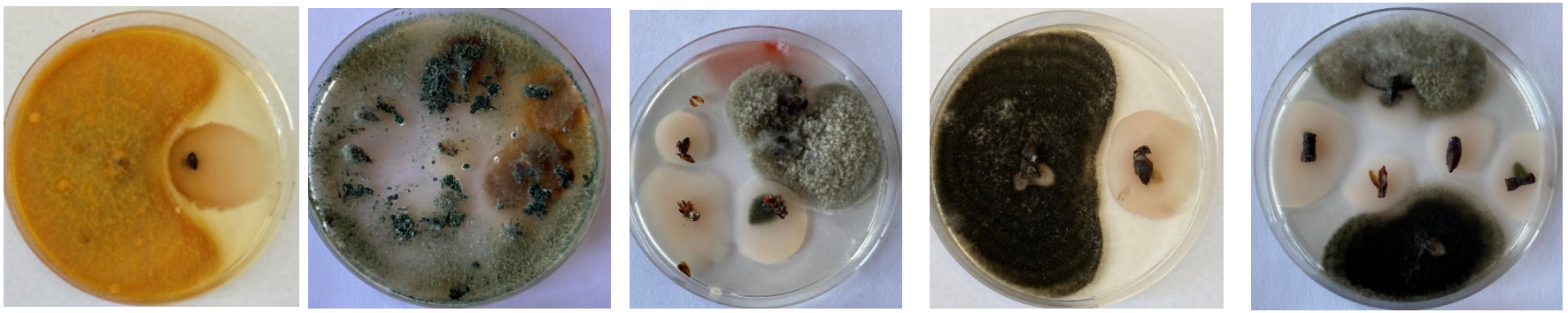






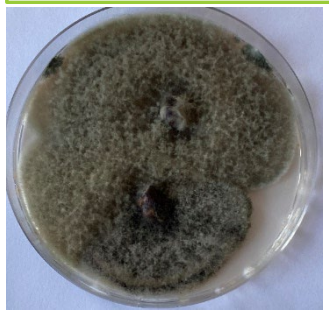
Endophytic community associated with pear buds

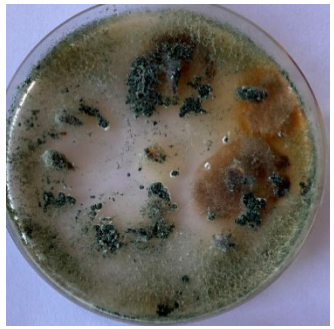




Buds

Conference

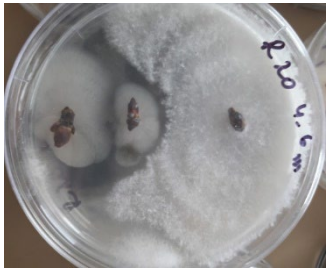




Euras

Corina

Cristal

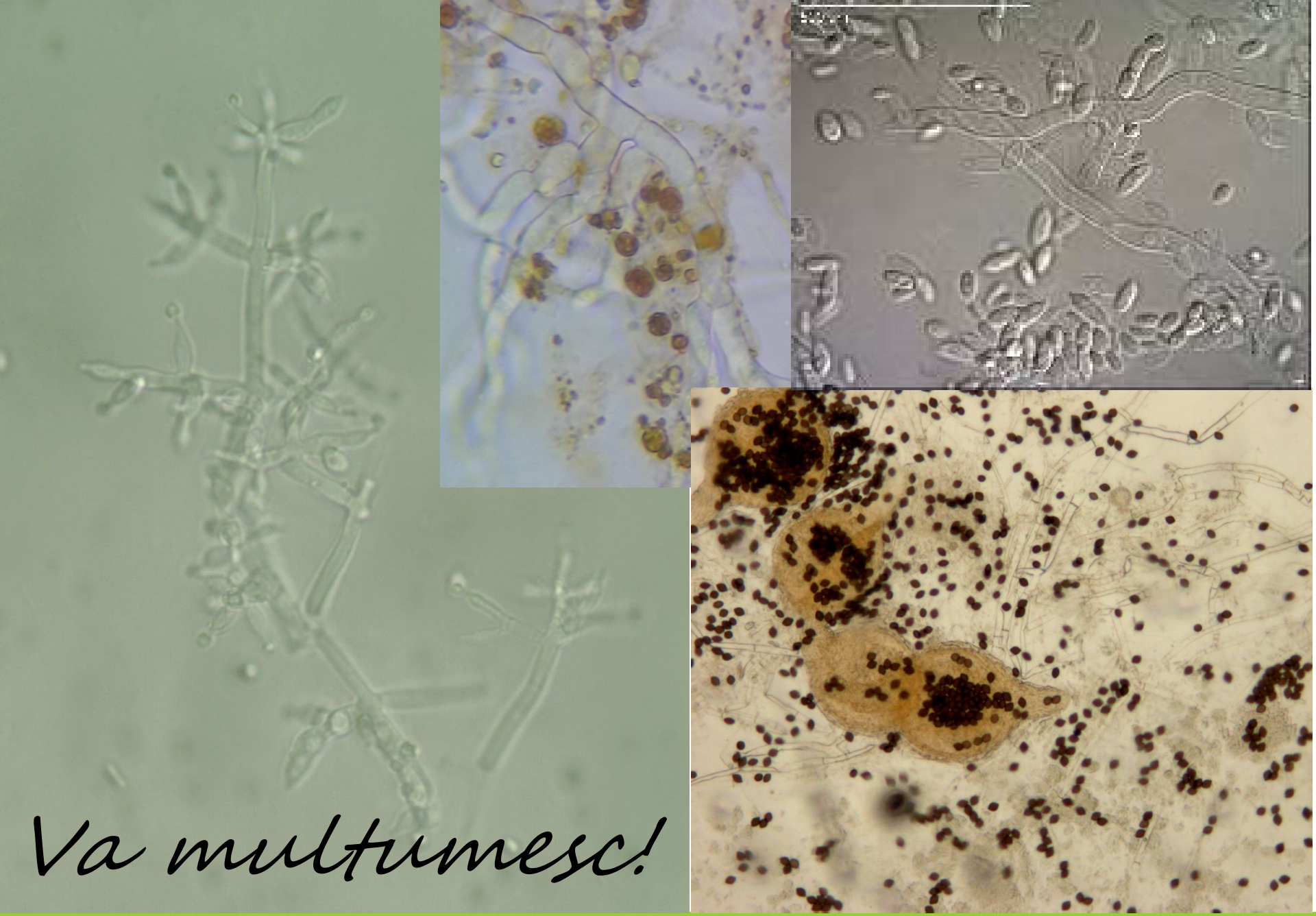


First screening of microbial endophytic community associated with pear twigs and buds

Our results highlights the presence of antagonistic isolates belonging to *Aureobasidium*, *Epicoccum*, *Sordaria*, and *Trichoderma* genera

Knowledge of the endophytic community can bring information on their role, interactions with plant pathogens and their mechanism of action

Screening of antagonistic properties of our selected isolates (Aureobasidium, Trichoderma, Sordaria, Epicoccum) to leaves and twigs pathogens – in vitro tests (on mycelial growth, Volatile Organic Compounds and non volatile organic compounds)



Va multumesc!